UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

February 21, 2013

REPLY TO THE ATTENTION OF:

Mr. Tom Harmening
City Manager
City of St. Louis Park
5065 Minnetonka Boulevard
St. Louis Park, MN 55416

Mr. John Jones
Director of Regulatory Management
Vertellus Specialties, Inc.
201 North Illinois Street, Suite 1800
Indianapolis, IN 46204

RE: Vertical Gradients in Groundwater
Reilly Tar & Chemical Superfund Site, St. Louis Park, Minnesota

Dear Mr. Harmening and Mr. Jones:

The Minnesota Pollution Control Agency (MPCA) and the U. S. Environmental Protection Agency (EPA) received the a letter on January 6, 2011 from AECOM on behalf of the City of St. Louis Park (City)[1] discussing vertical migration of contamination at the site. This issue (potential downward vertical migration of contamination from upper aquifers into underlying aquifers) was recommended for assessment and follow up action in the 2006 and 2011 Five Year Reviews for the site. Staff from the Agencies reviewed the letter and other relevant information. We appreciate that, like the Agencies, the City committed time and resources to address this issue.

The 2006 Five Year Review recommended monitoring the extent of vertical migration of contamination between aquifers to determine whether the migration predicted by groundwater modeling, can be verified. The City gathered water level data and showed the potential for strong vertical gradients in the upper aquifers. We agree with the concept that groundwater is migrating vertically as well as horizontally in the vicinity of the site and that there is a vertical component of contaminant transport due to those hydraulic gradients.

The Agencies also agree that leaky multi-aquifer wells contributed to contaminant migration from shallow aquifers to deeper aquifers. However, we do not think that contaminant transport via vertical hydraulic gradients between the aquifers can be dismissed as a cause or future source of contamination to the deeper aquifers. The Platteville Glenwood and basal St. Peter formations are not completely effective in preventing vertical migration of contamination from the Reilly site.

With regard to the "Water Level Data Demonstrating Vertical Gradients" section of the letter, we agree that water level monitoring in the various aquifers in St. Louis Park has confirmed the

[1] By agreement with the former Reilly Tar & Chemical Corporation (successor Vertellus Specialties Inc.), the City operates and maintains the remedy for the Reilly Tar Superfund site.

presence of downward vertical gradients across the Glenwood and basal St. Peter formations. We also agree that low (primary) vertical hydraulic conductivity can impede the movement of contamination. However, we also recognize that the Glenwood formation is generally only a few feet thick and may be subject to secondary permeability features that increase the vertical movement of contaminants. The Geological Society of America Field Guide "Hydro-stratigraphy of a fractured, urban aquitard[2]" concludes,

> "Our results thus far on this and other Paleozoic bedrock units traditionally regarded as aquitards in this region indicate that they are best considered 'hybrid' hydro geologic units…they can also contain bedding plane conduits of very high hydraulic conductivity with the potential to accommodate rapid flow of very large volumes of contaminants. We informally refer to such bedrock layers as 'aquitardifers.'"

Further, it should also be noted that AECOM's reference to the Glenwood as an effective confining layer assumes that the Glenwood is laterally continuous throughout the region. Mapping completed by the Minnesota Geological Survey has identified known areas where the Platteville-Glenwood does not exist.

The Agencies do not believe that Drift and Platteville gradient control wells completely control vertical contaminant migration to the deeper St. Peter aquifer. However, the wells do help control contaminant migration through mass removal and decreasing the vertical gradient locally. Pumping groundwater at low rates from the shallow gradient control wells does not significantly affect the vertical gradients. But, such pumping weakens the shallow sources of contamination and slows the rate of downward contaminant migration, thus giving the system more time for contaminant degradation, dilution and other attenuating processes.

To summarize, we agree with the concept that groundwater is migrating vertically, albeit likely less so than horizontally through the multi-aquifer system surrounding the site. Water level data interpreted by the City demonstrates this. The City has not presented contaminant concentration data in the context of the strata to prove or disprove that a significant portion of contaminant mass is or is not migrating along vertical hydraulic gradients. Regardless, the Agencies recommend minimizing the vertical migration of contaminants by maintaining the existing gradient control network for the multiple shallow aquifers at the site, in addition to continuing to pump and treat the deeper drinking water aquifers. As the existing network removes contaminant mass, less contamination will be available to migrate downward and affect sources of drinking water.

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[2]Anderson, J.R., Runkel, A.C., Tipping, R.G., Barr, K.D.L., and Alexander, E.C., Jr., 2011, Hydrostratigraphy of a fractured, urban aquitard, in Miller, J.D., Jr., Hudak, G.J., Wittkop, C., and McLaughlin, P.I., eds., Geological Society of America Field Guide v. 24, pp.457-475, doi:10.1130/2011.0024(22).

Please contact us with questions on any points raised herein; feel free to call Nile Fellows at (651) 757-2352 or Michelle Kerr at (312) 886-8961.

Sincerely,

Michelle Kerr
Remedial Project Manager
Superfund Division
U.S. Environmental Protection Agency

Nile Fellows, Project Leader
Superfund Unit 1
Superfund and Emergency Response Section
Remediation Division
Minnesota Pollution Control Agency

cc via e-mail: Mike Rardin, City of St. Louis Park
Scott Anderson, City of St. Louis Park
Dave Scheer, MPCA
William M. Gregg, Summit
Thomas Mesevage, Vertellus